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*Running out of credit : the limitations of mobile telephony in a Tanzanian agricultural marketing system**

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ABSTRACT

Poor farmers often lack credit to purchase agricultural inputs, and rely on their buyers to provide it. This paper considers the effects of mobile phones on traders of perishable foodstuffs operating between Tanzania's Southern Highlands and Dar es Salaam's wholesale market, with a particular focus on the importance of credit in the relationship between potato and tomato farmers and their wholesale buyers. It argues that the ability to communicate using these new information and communication technologies (ICTs) does not significantly alter the trust relationship between the two groups. It also suggests that farmers, in effect, often have to accept the price they are told their crops are sold for – irrespective of the method of communication used to convey this message – because their buyers are also their creditors. In this situation, many farmers are unable to exploit new mobile phone-based services to seek information on market prices, and potential buyers in other markets. Doing so runs the risk of breaking a long-term relationship with a buyer who is willing to supply credit because of their established business interaction. It is suggested that, under a more open system than currently exists in Tanzania, mobile-payment ('m-payment') applications should target these creditor-buyers as key agents in connecting farmers to the credit they so often require.

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INTRODUCTION

> Telephones are another burning issue. Empirical work indicates that agricultural traders have access to phones for personal use but make virtually no use of them for business purposes. This is in part a reflection on the lack of trust between traders, but also on the absence of land line telephone services in agricultural markets. Consequently traders constantly have to travel to supply markets, raising transport and search costs. It would be much cheaper if traders could operate over the phone from their offices. The spread of mobile phones may ease this constraint. Time will tell.
>
> (Fafchamps 2004: 481)

Much of the research looking at the use of mobile phones in developing countries focuses on the supply side. It tends to be either based on anecdotal evidence (of little analytical value), or centres on reports of often unsustainable donor projects that fail to represent typical situations for many users of information and communication technology (ICT). While the Commonwealth Telecommunications Organisation has completed a thorough study looking at the economic impact of telecommunications and poverty reduction across three developing countries (Souter *et al.* 2005), its findings are largely based on quantitative data and serve to feed what James (2005) regards as a voluminous yet fragmented literature covering ICT in Africa and other developing countries. The literature lacks qualitative research that looks in detail at different sub-sectors of the economy, and assesses how individuals interact with other entrepreneurs now that new methods are available for obtaining information, and for communicating.

A notable exception to this trend, albeit from a more econometric approach, is Robert Jensen's (2007) research into the adoption of mobile phones by fishermen along the coast of India's Kerala state. Jensen shows that, as mobile phone coverage became available from 1997, the proportion of fishermen who travelled beyond their usual markets in Kerala to sell their fish jumped from zero to around 35 %. Furthermore, wastage was eliminated completely, and the 'law of one price' – the idea that in an efficient market identical goods should cost the same – could come into effect. Jenny Aker (2008) provides recent findings from Africa that are broadly similar to Jensen's. Her study of grain traders in Niger suggests that the primary mechanism by which mobile phones affect market-level outcomes appears to be a reduction in search costs, as traders operating in markets with cellphone coverage search over and sell in a greater number of markets. Together these microlevel findings provide a good case for the benefits of mediated communication technologies (such as mobile phones) vis-à-vis price or demand information.

What the Kerala and Niger studies do not offer, however, is requisite detail about the shape of interpersonal networks and the resilience of face-to-face communication in the light of these new technologies. One recent exception, also from India, is Donner's (2007) work on the role of ICT and customer acquisition and retention. Though revealing similar findings to this paper on Tanzania – that face-to-face interactions dominate customer interactions even among those with access to ICTs – Donner does well not to dismiss altogether the benefits of mediated communication. In relationships that are face-to-face at their core, he notes, it may be possible that the mobile phone still has a role to play in accelerating and deepening these liaisons. If this is the case (and there is nothing to say that it is not), then Donner (*ibid.*: 10) suggests that a useful future research frame would be to replace a focus on mobile-mediated versus face-to-face interactions with one that examines the synergies and interactions between the two.

This paper fills these lacunae by presenting qualitative results from fifteen months of fieldwork, looking at how ICT are being accessed, adopted and appropriated by the many farmers and traders in Tanzania who are not directly influenced by donor projects. Consideration is given to the changes that mobile phones have brought to the relationship between farmers and the wholesalers (*madalali* in Swahili, sing. *dalali*; literally 'auctioneers') they supply to, with a particular focus on the importance of credit in the relationship between the two.

These findings form part of a research project investigating how, why and to what effect ICT is being adopted for use in micro and small enterprises (MSEs) across different sectors of Tanzania's developing economy. The broader study looks also at the informal construction sector in Dar es Salaam (Molony 2008b), and the export of African blackwood carvings from the country. Together with the results of the case study into the domestic trading of perishable foodstuffs presented here, the project comes to two main conclusions. Firstly, it shows that, as elsewhere in the world, mobile phones in Tanzania are commonly put to an ordinary, 'non-developmental', use that appears to be ignored by northern agencies, research organisations and media who seem to be preoccupied by the potential for mobile phones to aid personal or collective 'development' in poor countries (Molony 2008a). Secondly, the project cautions that, where mobile phones are applied to enterprise, some traditional pre-ICT aspects of the African business culture look set to remain for some time. Trust and the need for direct, personal interaction through face-to-face contact – one of the most pervasive features of African MSE economies (Egbert 2004; McCormick 1999: 1532; Mungunasi 2000: 4·1; Trulsson

1997: 132–3) – emerge as a common theme across the case-study industries, and are likely to remain a crucial aspect of the way most MSE business is conducted (Molony 2007). In this paper 'trust' follows Dasgupta's (1988: 51) definition, and refers to 'expectations about the actions of other people that have a bearing on one's own choice of action when that action must be chosen before one can monitor the actions of those others'.[1]

DATA COLLECTION

Fieldwork for the case study mostly took place in March, April and September 2003, with some follow-up questions during visits to Dar es Salaam in subsequent years. Semi-structured interviews were conducted with fifteen tomato and potato farmers, four intermediary traders (*wafanyabiashara*), and five Dar es Salaam-based *madalali* wholesalers. The network of a small number of *madalali* was approached with the help of Eliab Chijoriga, a foodstuffs marketing expert and Director at the Tanzania Commission for Science and Technology (COSTECH). Chijoriga gave access to Dar es Salaam-based wholesalers in the Kariakoo municipal market, who then offered the contacts of the farmers from whom they receive produce. With the help of these farmers whose business dealings could then be physically followed in order to track their use of ICT, a complete marketing chain of suppliers and traders was attained. All the farmers and traders covered in this sample were African and happened to be male. Two brief biographies of farmers who were interviewed provide a flavour of the background of those who are quoted:

> Angelo Kilave is a tomato farmer from Mtitu in Iringa region. Born in 1968 within the Mhehe tribe, he started farming maize in Mtitu when he left primary school. His strategy was to save small amounts of his profits, and gradually he was able to diversify to tomatoes and peas which he grows (with the help of his wife and five workers) on the six acres of land he owns, and to buy a bicycle which he uses to travel locally. He started dealing with Kariakoo in 1996, where he supplies to two *madalali* who are also from Iringa. At the time of the interviews Angelo did not own a phone, and contacted Kariakoo from a TTCL landline in Iringa town.
>
> (Angelo, 2003 ints.)

> Exoni Manitu is also a tomato farmer, from the village of Kidamali in Iringa region. He works closely with his wife, who appears to enjoy an unusually equitable relationship in terms of work responsibilities and decision-making in their marriage. The couple live in an old, large local-brick farmhouse with extra rooms that they generally use to store their tomatoes. Exoni used to run a hotel/restaurant/bar, but in 1983 decided to concentrate on farming tomatoes because

he saw there was a market that could bring good profit. He invests this profit in growing maize, beans and rice. Nevertheless, he describes himself as a 'former' large-scale tomato farmer since he lost almost his entire fortune in 1986 when a lorry carrying rice he was trading turned over and petrol contaminated the entire (uninsured) load, making it unfit for consumption. However, the *dalali* to whom Exoni supplies tomatoes in Kariakoo has apparently not pressurised him to repay the restart capital that he loaned him, and Exoni still owes this money. Exoni travels by bus to his four acre plot in Lukwambe area, Mangalali, where he grows his crops. At the time of the interview nobody in the household owned a mobile phone, so Exoni used a friend's phone to contact Kariakoo. Over the space of two months in mid 2003, however, four farmers purchased mobile phones, bringing the total number of tomato farmers owning mobile phones in the settlement of Kidamali to six. Follow-up studies would undoubtedly reveal further ownership of mobile phones in this and other settlements covered here.

(Exoni, 2003 ints.)

The paper begins by outlining the ICT situation in Tanzania, and shows why food marketing is important to the country. It then provides background on the marketing chain, players and processes, noting features of the communication between farmers and their *madalali*. This is followed by an analysis of the advantages and limitations of ICTs in agricultural trading, with the assertion that at times the (mobile) telephone is simply insufficient as a comprehensive means of communication between trusted partners. The final section asks whether it is possible to operate successfully without a mobile phone. The focus is on one middleman, Kamwene Sanga, whose experience highlights the centrality of mobility in dealings between wholesale buyers who are based in Dar es Salaam's Kariakoo municipal market, and farmers in rural isolated communities.

ICT IN TANZANIA

The population of Tanzania was 39·5 million in 2006 (World Bank 2008). In the same year the International Telecommunications Union (ITU) reports that only one Tanzanian in a hundred was recorded to be an internet user, against an average of 3·23 per hundred across the sub-Saharan Africa region.[2] Meanwhile, there were 0·58 (236,000) fixed telephone lines per hundred of the population, comparing to an average of 1·65 across the region. By contrast, 20·4 per hundred people in Tanzania were mobile phone subscribers (against 23·9 per hundred in the region) (ITU 2008).[3]

The telecommunications regulator, the Tanzania Communications Regulatory Authority (TCRA 2008), reports that by the end of 2007 there were about 8·5 million voice telephone subscribers (an increase of about 47 % from 2006). Mobile telecommunications lead the market with 97 %

of subscriptions, against 3 % for fixed-line services. While the population of Tanzania is growing at the rate of 3·3 % annually, the annual number of Tanzanians subscribing for a telephone line has grown at an average rate of 48 %. The market leader in terms of subscription share is still Vodacom, with 45 % of all subscribers (52 % in 2006). Celtel ('Zain' since August 2008) ranks second with 30 % (26 % in 2006), followed by Tigo (14 %, 13 % in 2006), Zantel (8 %, 6 % in 2006) and TTCL (3 %, the same as 2006) (TCRA 2008).[4]

The latest tariff figures for Tanzania show the average cost per minute for a domestic call to a subscriber on the same mobile phone network to be US$0.18, a reduction of US$0.15 from 2001. The average cost of a call from a mobile phone to a fixed network was US$0.22 in 2006, a figure that has more than halved from the US$0.54 rate five years before (TCRA 2007a). These figures compare with US$0.03 for text messages with both Vodacom and Zain (who offer reductions depending on the price plan).[5] With a gross national income per capita of US$350 (World Bank 2008), it is unsurprising that, as with low-income groups elsewhere (Castells *et al.* 2007), the vast majority of mobile phone customers in Tanzania operate pre-paid accounts and tend to favour text messaging over voice calls.[6]

FOOD MARKETING IN TANZANIA

Agriculture is Tanzania's most widespread economic activity, acting as the largest employer of the labour force. It provides a livelihood for some 80 % of the economically active population and also makes the largest contribution to GDP, 45·3 % in 2006 (World Bank 2007). Despite this, research on agro-food systems has mainly concentrated on the export of produce (Lyon 2003: 12), a situation that runs the risk of ignoring the politically strategic importance of basic food entitlements at the domestic level as 'part and parcel of every Tanzanian's birthright' (Bryceson 1993: 4). At a time when new ICT is hailed as a driver of development apparently capable of revolutionising the way business is conducted (DOI 2001; UNDP 2001; World Bank 1998), a study of the marketing channels through which much of the population makes a living selling the smallholder produce so essential in stimulating broader economic growth and contributing to rural (and national) poverty reduction (Poulton *et al.* 2006) is crucial. Perishable foodstuffs are one of the most salient agricultural sub-sectors to study because their propensity to rot – especially tomatoes – requires a delivery process that allows prompt communication.[7]

Farmers

The broad categories of farmer can best be conceptualised along a spectrum. This reflects differential access to capital with small-scale farmers – who tend to have poor access to capital – at one end, and large-scale farmers at the other. Small-scale farmers are often barely above subsistence level, risk averse (Thomson & Terpend 1993: 4) and, with the help of labour from members of the immediate family, rely on farming as their main source of income to cover basic needs. Since they produce less than other groups of farmers and their earnings are smaller, an individual smallholder farmer's decision to supply distant fresh produce markets, such as Kariakoo, is affected by his more immediate need for cash and the transport costs of sending small amounts over long distances. This group of farmers is the biggest in the country and makes the largest contribution to the country's total crop output.

At the opposite end of the spectrum are a smaller group of large-scale farmers who oversee the farming of areas of land larger than those farmed by smallholders and middling smallholders. These tend to have better access to capital and land, enabling them to take advantage of optimal seasonal variations such that they can constantly have some piece of land under cultivation and supply the market with crops throughout the year. In any of these locations, large farmers do not usually undertake much of the actual physical labour of farming, if any. With higher yields resulting from their access to productive land throughout the year, the frequency of their output reaching Dar es Salaam is higher than that of their smaller counterparts, with some of the largest farmers managing to supply Kariakoo almost daily.

Middlemen

Tomatoes and potatoes can be sold by a farmer either at a nearby market, or to one of two types of middlemen. He can sell them locally to a mobile intermediary trader (*mfanyabiashara*; pl. *wafanyabiashara*), or send them to a *dalali* in a larger city market such as Kariakoo.[8] The *mfanyabiashara* usually travels straight to villages to source and purchase potatoes or tomatoes that are then sold to markets throughout the country. For farmers in the rural areas without a buyer they usually supply to in Kariakoo, the *mfanyabiashara* plays a crucial role in further saving the farmer the hassle of finding somebody, and dealing with communications (Angelo 2003 int.). He can even be a buyer of last resort for those farmers with an established buyer in Dar es Salaam, who tells them to sell locally when the price in the city is so poor that neither of them will make a profit if they are sent to Dar

es Salaam. Deborah Bryceson (1993: 130, translation in original) describes the *mfanyabiashara* thus:

> The main prerequisite is 'being known'. Several traders confirmed the importance of being popular. A wholesaler has to have 'nous' (*akili*) and a reputation for having many clients, being well-liked, respected and trustworthy. An outgoing personality, shrewdness and an aura of invincibility as 'Mr Fix-it' combine to form the mystique of the successful wholesaler.

These are social skills – among them a long list of contacts, charisma and popularity – that fit an individualistic definition of social capital (Glaeser *et al.* 2002).

Primary and secondary stockists, who store the crops for a small fee, sometimes buy between the farmer and *mfanyabiashara*. A sub-category of this type of trader is the *kiunganishi* (literally 'connector', connecting farmer and *dalali*), who differs from the *mfanyabiashara* in that he is usually a farmer himself in the area where he lives and acts as a field agent representing one particular *dalali* only. A *kiunganishi* organises the collection of crops from the same pool of local farmers every season. Middlemen, groups of farmers, or large farmers with the resources, then send their crops to a *dalali*.[9]

The *dalali* is a wholesale broker who is usually stationed at Kariakoo where he receives farmers' produce and, acting as a farmer's agent, handles and sells it on to buyers who can be owners of, or distributors to, smaller sub-markets throughout the city as well as hotels and traders delivering to neighbouring countries where there is demand. The most competitive *madalali* are supplied by a large pool of farmers and have multiple selling channels that enable them to oversee the efficient receipt and sale of consignments at even the busiest times. They operate in an economically risky environment that is characterised by high incidence of transaction failure.[10]

Features of communication between farmer and dalali

Where new ICTs are adopted, it is the mobile phone, and not the internet, that is more often used by the domestic traders covered in this study. Proportionally, the use of the internet remains scarce in Africa and across developing countries, despite the attention given to it in the 'ICT for Development' literature (Donner 2006a: 16; 2006b: 6), and its clear potential in providing market information on international prices, commodity stock levels, futures and insurance markets (Ponte 2002: 174), which is undoubtedly now being exploited by export trading companies with better access to the required infrastructure. In general, it is large-scale

and middling smallholder farmers who own mobile phones, or, as one source from the Kariakoo Market Corporation put it, mobile phones have been adopted by 'the educated: businessmen and emerging businessmen, not mere peasants. The peasant-businessman uses them' (Nicanor 2003 int.). These are a minority of farmers who, in addition to being able to afford the cost of a mobile phone and credit, may also be linked to the national grid or in rural areas own a generator with which to charge their handset.[11] For some smallholder farmers with meagre incomes, the financial cost of mobile phone access through even a phone kiosk (*huduma ya simu*), let alone purchase, is so prohibitive that regular use is simply not feasible.

The communication between farmer and *dalali* tends to concern supply and demand information directly related to the buying and selling of a farmer's crops. This communication occurs at a distance because it is impractical and unnecessary for either partner to travel to communicate with the other face-to-face. Before the introduction of the mobile phone, this information would often be exchanged through intermediaries and was often too late to be effective. It is here in exchanges of supply and demand information that mobile phones hold the most benefit for both buyer and seller, because they allow for the first-hand exchange of such information while it is still up-to-date and can be acted on. Despite the opportunities that mobile phones offer, however, distance and the marginality of many farmers still make it difficult for traders to do business with those residing in rural areas (Molony forthcoming). In terms of the infrastructure, roads in the Southern Highlands – other than the well-maintained Dar es Salaam–Zambia TANZAM highway – are still in very poor shape. Farmers who are far from the main road are marginalised not only because they have difficulty in reaching the market, but even more so because private traders both avoid farms in areas off the main road where transport costs are too high in favour of areas with a good transport infrastructure (Bryceson 2002b: 728), and shun locations where information is less certain (Thomson & Terpend 1993: 8).

ADVANTAGES OF MOBILE PHONES IN AGRICULTURAL TRADING

The benefits of mobile phone access for agricultural trading can be summarised as aiding farmers' and buyers' knowledge of demand, and improving buyers' coordination of supply. In the event of a glut of supply, for example, a farmer with a mobile phone can know from his *dalali* to sell his produce to any *mfanyabiashara* or divert to numerous other local

markets for minimum profit, instead of maximum loss in Dar es Salaam (Nicanor 2003 int.). Mobile phones also allow for more reliable and faster means of sending information (where previously a messenger or postal service was used), and greater ability to keep track of consignments in transit and on arrival at the market. Together, mobile phones mean that less time and money is spent on travel, if not just by reducing travel-related risks (Jagun *et al.* 2007), then, apparently, by even providing a substitute for unreliable alternatives such as transport (Souter *et al.* 2005). In addition to saving money by ensuring a farmer's crops go to the right place for maximum profit, using a mobile phone means that money is also recouped in communication costs. While the cost of making a call using a mobile phone is still high in Tanzania, it is far lower than having no reliable access and having to travel personally to Dar es Salaam, or the risk of sending somebody else to make decisions that could just as easily be made in the village.[12] The same holds true for *wafanyabiashara*, who previously shouldered the risk of having to rely on uncertain transport arrangements in rural areas and not knowing the availability of supplies and destination markets. This has been shown to be particularly costly where, in the absence of telephones, traders have to travel personally to obtain this information (Fafchamps & Gabre-Madhin 2001). As one large-scale farmer put it, 'before the [mobile] telephone somebody accompanying their crops to Dar es Salaam would spend much money on travel and three days' costs for a guest house and food, which would add up to a lot. Now the costs are much lower because you can just make a phone call' (Exoni 2003 int.).

LIMITATIONS OF MOBILE PHONES IN AGRICULTURAL TRADING

A deeper look at the relationship between a farmer and his *dalali* shows how the (mobile) telephone cannot always be relied upon as the sole means of communication between traders wishing to exchange more than supply and demand information. The relationship between supplier and *dalali* is set in a risky operating environment where farmers, particularly those marketing highly perishable fast crops such as tomatoes, invest much in the face of weather and price fluctuations and considerable threat of transaction failure. Farmers who are able to bear more of these risks are those with access to capital (Bryceson 2002a: 11). Capital can be made available either through successful income diversification (which may at some time require a creditor), or through a *dalali* who absorbs the risk of not recovering the investment should the harvest fail. Small-scale farmers, who usually have poorer access to credit since they have less capital to

diversify in the first place, tend to be more reliant on obtaining credit from a *dalali*.

A brief outline of the subsequent stages of interaction that strengthen the partnership between farmer and *dalali* until it reaches a mature 'permanently connected' level reveals the farmer's reliance on his *dalali*. It also helps to show that, despite the crucial role mobile phones play in allowing for mobility whilst improving the exchange of supply and demand information between farmer and *dalali*, the use of mobile phones in all other aspects of the business relationship is limited.

During the opening stage where the farmer seeks a *dalali* to supply to, he relies on local social networks of other farmers in his nearby villages to recommend traders with a good reputation. Usually, having decided on a suitable *dalali* – with whom he may or may not have had telephone contact – the farmer then travels to meet the *dalali* personally and starts to send all his crops to that individual. Any further telephone contact tends to concern the exchange of supply and demand information. If an emerging farmer does not manage to get good recommendations from other more established farmers in his local social network (perhaps because others are not willing to stake their own reputations on him), he may approach a *mfanyabiashara* to put him in touch with a *dalali*. In this respect *wafanyabiashara* could also be described as 'phone book gatekeepers'.

If a farmer wishes to continue supplying the same *dalali*, it is around this next (second) stage in the relationship that he may then again visit him personally in Kariakoo to sort out any teething problems that may have arisen. The two may decide, now, whether they wish to continue doing business together. After a period of repeated exchange (usually a few months or a season) at a distance with the farmer in the village and the *dalali* in Kariakoo, communicating supply and demand information from the market by mobile phone, the farmer again visits his *dalali* at the marketplace to renew ties and exchange information about methods and the market. Generally, the flow of information seems to be from *dalali* to farmer, although the *dalali* also learns independently about the progress of other farmers and takes the initiative in fast-tracking conditions that could help him predict further supply in the surrounding villages from the area itself. Both buyer and seller seem most comfortable with this 'question-and-answer session' being at a face-to-face level, and indicate that the information could not so easily be exchanged freely over the telephone. As one farmer put it,

> the information is better because it is live and I am free to ask questions when they come to mind. I don't feel under the pressure like in a phone call when I can only exchange greetings with the *dalali* and find out about market demand. When we

are meeting face-to-face I have more time to find out information that the *dalali* may know about sourcing cheaper inputs which I can then arrange while in Dar es Salaam, and what varieties are in demand and about new farming methods.
(Angelo 2003 int.)

By this time, the exchange of goods has usually been smooth for some period and the relationship between the two more established, allowing the farmer to approach his *dalali* for financial assistance. At this 'financial assistance' (third) stage the farmer is most comfortable with discussing credit personally with his *dalali*, not over the telephone. Indeed, the roundabout, almost indirect, way that he may ask the *dalali* for financial assistance would not be so easy if the two were not alone together, speaking face-to-face. So here the mobile phone appears to be most useful in getting hold of the farmer for the marketplace meeting, and for little else.

If the exchange continues over time, the relationship between a farmer and his *dalali* becomes what one farmer describes as a 'permanently connected' relationship. At this (fourth) stage, the mobile phone is used less frequently. By this stage the farmer trusts his *dalali* both to sell at the best price with barely any communication, and to handle many of the farmer's finances in the city, depositing money into his bank account if he has one (or one belonging to a trusted friend), and paying remittances to relatives or others with whom the farmer is doing business. As some informants remark, 'the *dalali* is caring for the farmer to the extent that it appears that he is a relation' (Kuboja; Bartholomeo & Festo, 2003 ints.). By this period, neither has much reason to communicate frequently with the other unless they wish to exchange information about demand in another market for another crop that could bring them a good profit, or if for some reason they wish to meet face-to-face.

As the empirical findings of this paper demonstrate, the evidence from Tanzania has a close parallel to those that have influenced the conceptual literature on trust, and in particular the work of Fergus Lyon (2000: 672), who regards what he terms 'customer friendship' as a one of the key mechanisms of trust in the relationship between farmers and traders in Ghana. Here the division between social and economic activities is unclear, with farmers and traders visiting their customers when passing, and gift-giving and reciprocity (both on village visits or where the farmer visits the customer) serving different purposes for the different actors at different times. According to Lyon's analysis of such a relationship, customer friendship can be seen to be economically functional and is based on the same information and sanctions as working relationships, but also draws on shared concepts of morality and altruism based on culturally specific norms.

All these interactions between a farmer and his *dalali* rely on trust, but there is nothing conclusive in this case study (or a recent study in South Africa and Tanzania by Goodman 2005: 64) to suggest that the mobile phone itself can actually facilitate the trust relationship between any type of farmer (smallholder, middling smallholder or large-scale farmer) and his *dalali*. Although it does seem that those farmers with a closer bond of trust are less likely to be cheated by a *dalali* reporting lower prices, the mobile phone cannot alter the trust between the two – the *dalali* can still be untruthful in telling a farmer how much he sells his crop for. Non-ICT methods of cross-checking prices are possible (such as asking farmers who have recently returned from the market), but where ICT is available it is surely better for farmers to have an independent source on the true value of their crops at the precise time that they want to send them.

Donor and private sector initiatives have realised this opportunity and have started to provide market information – usually at a price – to some of the huge mass of farmers across the continent who could benefit from such a service. The Netherlands-based International Institute for Communication and Development (IICD 2008) has a project supplying market prices to cotton farmers in Tanzania, but like so many donor projects this runs the risk of being unsustainable when funding dries up. More sustainable alternatives might benefit from looking at where the private sector has invested. One example is a joint venture between Manobi, a French private telecommunications company, and local entrepreneurs in Senegal, who use Wireless Application Protocol (WAP) and short messaging service (SMS) technology via mobile phones to provide fishermen with up-to-date access to market prices for their perishable products (Manobi.sn 2008). This was inspired by the success of Manobi's similar scheme for Senegalese fruit and vegetable farmers, who at US$0.29 cents a minute use WAP-enabled mobile phones to obtain prices that are updated in real time via a central processing and transmitting database by data collectors at various markets. Manobi, along with a similar service operated by the Kenya Agricultural Commodity Exchange (KACE) and an SMS service linking farmers with Zambia National Farmers Union (ZNFU) commodity prices, all provide transparency of prices inside the market that their Tanzanian counterparts lack.[13]

The risk is that while mobile phone-based services provide farmers with the opportunity to supply to different buyers, by not building a relationship with one *dalali* alone farmers are weakening their ties with their traditional source of credit. A crucial question is: what happens to the relationship between a farmer and a *dalali* if a farmer's access to this new source of market information, through using a mobile phone, influences

him to supply to different buyers every time he sends his produce to market? The solution for farmers here may be to use cooperative or even more formalised banking, which in Tanzania is now slowly beginning to provide credit to small-scale customers (Andrew 2004). There is also a market opportunity for mobile phone operators to target *madalali* as the pioneers of services such as MTN's mobile banking in South Africa or, for farmers without a bank account, Safaricom's m-Pesa mobile-payment ('m-payment') application in Kenya or various new services being offered in Tanzania.[14] *Madalali* generally have a much better record of getting credit to the rural poor than formal credit systems in low-income countries (Lyon 2000: 678), and could continue to provide this service by using mobile phones to conduct money transfers to farmers quickly and safely. Ways then need to be devised to merge the effectiveness of *madalali* as creditors to a more open system like the ZNFU commodity index that exposes farmers to other markets.

PERSONAL RELATIONSHIPS AND SUCCESS WITHOUT A MOBILE PHONE

That the mobile phone appears to have only one significant benefit in the trading of perishable foodstuffs – that of allowing for mobility while facilitating the flow of supply and demand information – raises a final question, and one that farmers are increasingly asking themselves as mobile phone coverage grows and the cost of using the technology drops: is still possible to operate successfully *without* a mobile phone? For the farmer, the answer is probably in the affirmative, so long as he is prepared to accompany his crops to Dar es Salaam and travel around the city finding better prices if the price offered to him in Kariakoo is not good. The disadvantage of this option, however, is that being away from the farm costs a farmer time and money that could be saved using a *huduma ya simu* phone kiosk to contact the market beforehand.

For a *dalali* it would be more difficult not to use a mobile phone, but one potato-trading *dalali* does manage to do so successfully, if at times precariously, in the seemingly frantic trading that he conducts in Kariakoo and the countryside. Kamwene Sanga hails from Iringa where he was born into the Bena tribe. He started small-scale trading of vegetables in Kariakoo in 1977, where he laid his produce on the floor outside the main market building. After a few years he and a friend had gained enough capital to pay for the trading fees inside the main building, where they sold small bags of tomatoes, cabbages and potatoes. Initially these vegetables were from one sole supplier, but gradually Kamwene was able to build

relationships with farmers beyond his home area of the Southern Highlands, in other fertile regions of the country such as Kilimanjaro and Tanga. He began travelling to Zanzibar to sell these vegetables, but after a couple of years got others to do this on his behalf. While he still sends some orders to Zanzibar, Mozambique and Comoros, most of his orders are now for within Dar es Salaam, and in Mtwara, on the border of Mozambique. He owns some land that he farms, but mostly relies on other farmers to supply him since they are able to spend time on growing quality produce (Kamwene, 2003 ints.). Initial accounts of Kamwene were somewhat picaresque, and his business associates refer to him as something of a lovable rogue. Nevertheless, he does appear to look after his suppliers, so much so that one *kiunganishi* refers to him as 'like a father in Kariakoo' for those farmers whose vegetables (mostly potatoes) he sells (Geoffrey 2003 int.).

Kamwene is notorious for his refusal to use a mobile phone, and is mocked by his fellow *madalali* as a 'peasant' (*mshamba*) for it. He explains his reasons for his personal rejection of the telephone in terms of how information he offers over the telephone can spread so much that it becomes counterproductive to all and reduces prices:

> I don't trust the telephone; it always lies.[15] I can tell a farmer to bring potatoes because the price is high, but then when the potatoes are delivered to me he [the farmer] complains that the price has dropped. I receive calls at my office but I never call the farmers back … They ask if they should pack, but when I answer and say 'Yes, send me potatoes', then many farmers send me them, which lowers the price and the farmers then complain to me.
>
> (Kamwene 2003 int.)

In contrast to farmers who during the early stages of a relationship will use the mobile phone to coordinate supply, this *dalali* chooses not to use a telephone and – through a combination of having many contacts to sell to in Dar es Salaam, and disappointing some farmers when he cannot sell their potatoes for a good price – still manages to deal with whatever is sent to him in Kariakoo, and to sell it quickly. Ordinarily, this would make a *dalali* unpopular among those who send to him and do not get their crops sold for a fair price, but something about this particularly charismatic *dalali* enables Kamwene to get away with it and still receive a steady stream of potatoes. This, he hints, lies in his genial relationship with suppliers and buyers, and in being selective about who one tells, if anyone at all, about the need for crops in Dar es Salaam, where the demand is. Though farmers will share information about market prices when asked, they will not advertise that they are sending their crops when there is demand (Edward 2003 int.). While it is futile to try

to hide that they are preparing their crops (because doing so often involves the help of many others and is highly visible), when demand information is first received is when it is most attractive to other farmers, and this is when some farmers say they are most selective about whom they inform. As expected, those farmers who say they are selective about the demand information they offer to others will tend to choose to inform only those individuals with whom they have a close relationship, which seems to partly explain Kamwene's success, even though he uses the telephone much less than others. While he is teased for shunning the telephone, Kamwene has personal relationships with many of the farmers in his home area who, along with fellow *madalali* in Kariakoo, widely respect him for his extra efforts to work at these relationships at a personal level.

Kamwene takes the time to visit his farmers in the farming areas even when he has no shortage of supply.[16] When visiting his rural buyers, Kamwene is popular and shows little sign of the arrogance that often characterises successful businessmen and can lead to resentment towards them. He takes the time to drink the local *komoni* (maize flour and finger millet-based homebrew) with the farmers who supply him, and in doing so renews ties in the way many other *madalali* will only do in Dar es Salaam when a farmer comes to them. By drinking with them and discussing farming, trading and anything else the farmers wish to talk about, Kamwene applies his social skills to meetings with farmers that are little different to those in the marketplace, but on their home turf. That the big man to whom they supply potatoes comes to meet and drink with them is appreciated by the farmers, as was expressed by one smallholder farmer of a merry group who had congregated around him:

> Kamwene comes to the countryside because he is a good *dalali* and he likes to drink *komoni* with us. Other *madalali* come to farmers when they want something, like a politician when it is time to vote. Kamwene comes many times and stays with us for a long time.
>
> (Geoffrey 2003 int.)

The meetings serve the additional purpose of facilitating Kamwene's coordination of supply, which, by refusing to use a telephone, he cannot do easily otherwise. At times while drinking in one small hamlet Kamwene discussed with different farmers when to send their crops to him in Kariakoo, in negotiations that closely resembled those only a visiting *mfanyabiashara* would normally conduct. Kamwene was adamant, however, that the talks had nothing to do with supply problems, and he insisted that he had a sufficient flow of potatoes to supply the demand of his customers in Dar es Salaam. Rather, it would seem that, by visiting the

farmers as a *dalali*, Kamwene is able to adopt the 'outwardly-directed social lifestyle' of the *mfanyabiashara* that Bryceson (1993: 141) observed.

This is a role that Kamwene appears to be comfortable with and that has helped him to be well known throughout Kariakoo and among many farmers in his home area in the Southern Highlands. So while not having a mobile phone may make his job hectic and he loses some friends along the way when he is unable to sell farmer's consignments to his many contacts in Dar es Salaam, it also manages to get him known locally and, crucially, recommended to emerging farmers (who may also have attended or heard of his meeting-cum-drinking sessions in their local area). All farmers in his home area send to Kamwene (usually through his *kiunganishi*), which ensures him a constant supply of potatoes with which to supply the smaller markets of Dar es Salaam and further afield, and to make a good profit in the process.

The point most worth emphasising from Kamwene's ability to operate without a telephone and still have a steady supply of crops from the rural areas and buyers throughout Dar es Salaam is that he has managed to build relationships with farmers and buyers so that they only consider supplying to and buying from him. This is not because they know of no alternative buyer or seller, but because Kamwene takes the time to do business face-to-face with both his suppliers and buyers, even when farmers are unable to come to him to do so. One large-scale tomato farmer explains that, irrespective of the location, physically meeting people is still important:

> For us Africans often an explanation over the phone is not enough even when you've greeted one another. When you see each other again you start afresh, greeting each other again. Likewise in business even if you've talked on the phone a businessman feels like he's not satisfied so he likes to meet face-to-face so you talk and this satisfies him. That's a way to build faith in business. You know nowadays there's so much competition in this business, so we get customers through information. It's imperative to see each other.
>
> (Berod 2003 int.)

The evidence of this study on perishable foodstuffs trading, and the focus on Kamwene in particular, supports Per Trulsson's (1997: 133) observation that the telephone may be considered relatively unimportant in business because personal relationships are formed from meetings conducted in person. He offers an example of dealing with government administration where, 'if one does not appear in their offices in person, the case will not be dealt with. Using a phone call or sending a letter rarely generates the desired response. It is the personal encounter that matters most.'

Nevertheless, the importance of the mobile phone in (theoretically) making a person more contactable should not be underestimated. Traders are now more mobile because they are no longer fixed to a landline location and, as Jensen (2007) has shown from his Kerala study, in perishable markets this allows entrepreneurs to venture further afield. The point is made most graphically by an entrepreneur in one of this study's other sectors:

> Before I bought my mobile phone I used to use TTCL or *huduma ya simu* [phone kiosk]. But without a mobile phone I couldn't be contacted easily by customers. For example, a customer wanted to give me an order and he would phone my brother but sometimes he [my brother] was not there. So I would use the *huduma ya simu*, but that was not reliable either because I didn't have a good relationship with those people … They can take messages from Dar es Salaam but I wouldn't always get the messages and this would annoy the customers and I would lose out on getting orders.
>
> (Maiko 2003 int.)

A further advantage is that with pre-paid accounts the mobile phone user is unlikely to be denied service from the operator, or to have the line disconnected due to unpaid bills. This, according to one informant, was why the Kariakoo-based *madalali* stopped using their landlines (Festo 2003 int.).

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Mobile phones are being integrated into Tanzania's existing agricultural trading business culture chiefly because of the crucial role they play in improving the exchange of supply and demand information between farmer and the wholesale market. This market information can be useful in freeing a farmer from sending his produce to the market blindly, by allowing him to know whether to divert his crops elsewhere for minimum profit more locally instead of maximum loss in Dar es Salaam. While mobile phones can help forge new relationships within the market, they play little part in strengthening current relationships – in the way that the example of the popular and successful Kamwene Sanga shows face-to-face communication can. The overriding drawback with distance communication, however, is that farmers using mobile phones to contact their *dalali* are largely asking for supply and demand information, and this relies on the *dalali* being truthful in the reply he gives. The reality for many farmers dealing with *madalali* in Kariakoo is that the mobile phone does not alter this trust relationship.

However, the reliance many farmers have on their *dalali* as a source of credit means that in return for credit they have little choice but to supply

their crops to him and accept that they may be cheated on the price they are told their crops are sold for. ICT can be used to circumvent this situation through mobile phone-based services that provide information on prices and buyers in other markets, but this runs the risk of a farmer's ties with his *dalali* – their traditional source of capital – being weakened. ICT may also help solve the credit dilemma if *madalali*, who generally have a much better record of getting credit to the rural poor than formal credit systems, are targeted as key agents in future m-payment applications aimed at agricultural traders. It is imperative to note that uses of new ICTs emerge from a socially embedded context that fundamentally influences and alters the uptake and usage of ICT. Without a strong empirical field reflection that details the *social* aspects of socio-economics, initiatives of private and donor organisations remain misdirected.

NOTES

1. For further discussion of trust in relation to ICT in developing countries see Molony 2007.
2. The ITU estimates this figure, explaining its methods in ITU 2007.
3. See Sutherland 2008 on the difficulties that multiple SIM card ownership poses in recording the number of mobile phone subscribers.
4. See <http://www.gsmworld.com/roaming/gsminfo/cou_tz.shtml> for detailed network information and coverage maps.
5. <www.vodacom.co.tz; www.tz.zain.com>.
6. In Africa's highly competitive mobile phone market, operators across the continent are wary of divulging detailed information about their market share. Representatives from Celtel and Vodafone could both confirm these (obvious) observations, but were unwilling to provide figures on SMS/call rates, or even on pre-paid/post-paid customer figures.
7. With the exception of Ponte's (2002) major work on 'fast' crops, staples are the most closely documented food crop in terms of government and academic studies, largely because they dominate production and consumption. Maize in particular is grown by more than 50 % of Tanzanian peasants for subsistence and commercial use and, often in the form of *ugali* stiff porridge, acts as the principal source of calorie intake in the country. For more on the political importance of staples see Bryceson 1993. For background on potato cultivation in Tanzania, with a focus on the Southern Highlands, see Andersson 1996.
8. *Mfanyabiashara* was the term most commonly used by Kariakoo *madalali* to describe a mobile intermediary trader, although various other terms were used by informants to refer to a person who engages in trade between a farmer and a *dalali*: *msafiri* ('traveller'), *mtu wa kati* (literally 'the person in between'), *msuluhishi* (literally 'arbitrator') and *mlanguzi* (literally 'profiteer' or 'black marketeer').
9. The research did find evidence, in line with Andersson's (1996) findings, of Dar es Salaam-bound lorries from Malawi and Zambia picking up a cargo of potatoes for additional income. This occurred less often with tomatoes, owing to their higher rate of perishability. The referral ('snowball') sampling method that identified the main base of informants in this research was generated from Dar es Salaam-based traders and led to their contacts in the Southern Highlands. These contacts were among the best suppliers, and frequently had good access to lorries based in their local areas.
10. For detail on the career pattern of *madalali* and the economic environment they operate in see van Donge 1992b. Helpful socio-economic background to this paper is provided in van Donge 1992a.
11. In 1988 only 2 % of houses in Iringa Region had electricity (URT 1997). Research conducted for Vodafone suggests a positive correlation between mobile phone ownership and access to electricity (Samuel *et al.* 2005).
12. Cross-network calls between Tanzania's four mobile phone operators (Celtel, Tigo, Vodacom and Zantel) averaged $0.22 in 2007, while average tariffs for calling the same network were at $0.18.

The same network figures are down from $0.33 in 2000 when Tigo (then Mobitel, and later Buzz) and Vodacom were the sole providers. Fixed line trunk calls have risen almost threefold over the same period. TCRA 2007a, 2007b.

13. <www.kacekenya.com; www.farmprices.co.zm>.

14. <http://www.mtn.co.za/?pid=219666; http://www.safaricom.co.ke/m-pesa>. On recent developments in Tanzania, see Southwood 2008.

15. In Ghana the mobile phone is called *ahoma trofo*, 'the line that tells lies' (Aggrey 2005).

16. This is a departure from a broadly correct observation that *madalali* 'are stationed at the Kariakoo wholesale market and are only involved in receiving farmers who bring their produce to the market' (Chijoriga 1992), and will only travel when supplies are low.

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Interviews

Multiple interviews were conducted with some informants over the period indicated in the introduction. Those listed below refer only to the specific interviews that are mentioned in the text.

Angelo Manigula Kilave, tomato farmer, Mtitu, Iringa region, 18.3.2003, 7.5.2003 and 5.9.2003.
Bartholomeo Sanga & Festo Mkilama, *madalali*, Kariakoo market, Dar es Salaam, 17.9.2003.
Berod Mhanga, tomato farmer, Ilula Mazomba, Iringa region, 4.9.2003.
Edward Sanga, tomato farmer, Kidamali, Iringa region, 6.5.2003.
Exoni Manitu, tomato farmer, Mangalali, Iringa region, 19.3.2003, 15.5.2003 and 6.9.2003.
Festo Mkilama, tomato *dalali*, Kariakoo market, Dar es Salaam, 15.4.2003.
Geoffrey Sanga, potato *kiunganishi*, Ntokela, Mbeya region, 23.5.2003.
Kamwene Benedict Mlelwa Sanga, potato *dalali*, Kariakoo market, Dar es Salaam, 5.1.2003 and 17.4.2003.
Kuboja Ng'ungu, General Manager, Kariakoo Market Corporation, Kariakoo, 27.8.2003.
Maiko Bakari, African blackwood carvings (*vinyago*) trader, Masasi, Mtwara Region, 22.7.2003.
Nicanor Omolo, Senior statistician, Kariakoo Market Corporation, Kariakoo, Dar es Salaam, 27.8.2003.